

STPS4045C

Power Schottky rectifiers

Features

- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- Low thermal resistance
- Avalanche capability specified
- ECOPACK[®]2 compliant component (STPS4045CT)

Description

This dual center tap Schottky rectifier is suited for switchmode power supply and high frequency DC to DC converters.

Packaged in TO-247 or TO-220AB this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

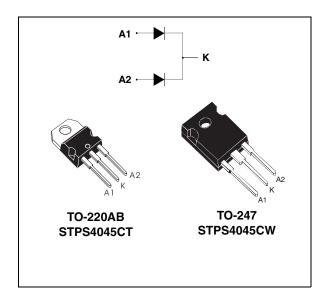


Table 1. Device summary

Symbol	Value
I _{F(AV)}	2 x 20 A
V _{RRM}	45 V
T _{j (max)}	175 °C
V _{F (max)}	0.63 V

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1 Characteristics

Table 2. Absolute ratings (limiting values, per diode)

Symbol	Parameter				Value	Unit	
V _{RRM}	Repetitive peak reverse volta	ge			45	V	
I _{F(RMS)}	Forward rms current				30	Α	
		TO-247	$T_C = 150 ^{\circ}\text{C}, \delta = 0.5$	Per diode	20	Α	
1	Avorage forward current	10-247	$T_C = 145 ^{\circ}C, \delta = 0.5$	Per device	40	А	
I _{F(AV)}	F(AV) Average forward current	TO-220AB	$T_C = 145 ^{\circ}\text{C}, \delta = 0.5$	Per diode	20	Α	
			T _C = 130 °C, δ = 0.5	Per device	40	А	
I _{FSM}	Surge non repetitive forward current $t_p = 10 \text{ ms sinusoidal}$				220	Α	
I _{RRM}	Repetitive peak reverse current $t_p = 2 \mu s \text{ square } F=1 \text{ kHz}$		1	Α			
I _{RSM}	Non repetitive peak reverse current		t _p = 100 μs square		3	Α	
P _{ARM}	Repetitive peak avalanche power $t_p = 1 \mu s T_j = 25 ^{\circ}C$			6000	W		
T _{stg}	Storage temperature range			-65 to + 175	°C		
T _j	Maximum operating junction temperature ⁽¹⁾			175	°C		
dV/dt	Critical rate of rise reverse voltage			10000	V/µs		

^{1.} $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ condition to avoid thermal runaway for a diode on its own heatsink

Table 3. Thermal resistances

Symbol	Parameter	Value	Unit		
R _{th (j-c)}	Junction to case	TO-247	Per diode Total	1.5 0.8	
th (j-c)	ouncilon to case	TO-220AB	Per diode Total	1.8 1.3	°C/W
R _{th (c)}	Coupling	TO-247		0.1	
		TO-220AB		0.8	

When the diodes 1 and 2 are used simultaneously : $\Delta T_j(\text{diode 1}) = P(\text{diode1}) \; x \; R_{th(j-c)}(\text{Per diode}) + P(\text{diode 2}) \; x \; R_{th(c)}$

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Table 4.	Static electrical	characteristics ((per diode)
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Symbol	Parameter	Tests conditions		Min.	Тур.	Max.	Unit
ı (1)	Reverse leakage current	T _j = 25 °C	V _R = V _{RRM}	-	-	200	μΑ
'R		T _j = 125 °C		ı	11	40	mA
	V _F ⁽¹⁾ Forward voltage drop	T _j = 25 °C	I _F = 20 A	-	-	0.76	V
V _F ⁽¹⁾		T _j = 125 °C		-	0.56	0.63	
r o mara romago arop	Tormara voltage arop	T _j = 25 °C	I _F = 40 A	•	•	0.94	•
		T _j = 125 °C] IF = 40 A	-	0.7	0.83	

^{1.} Pulse test : tp = 380 μ s, δ < 2%

To evaluate the conduction losses use the following equation : $P = 0.43x \ I_{F(AV)} + 0.01x \ I_{F}^{2}_{(RMS)}$

Figure 1. Average forward power dissipation Figure 2. Average forward current versus awbient temperature (per diode) $(\delta = 0.5 \text{ per diode})$

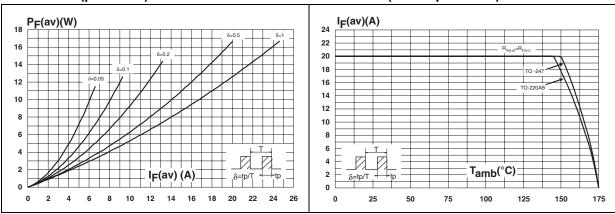
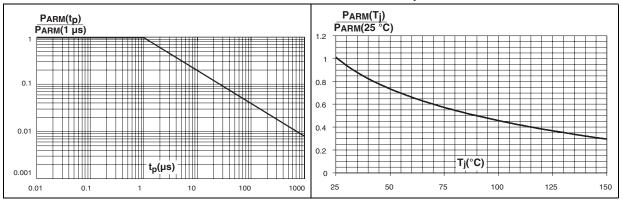


Figure 3. Normalized avalanche power derating versus pulse duration

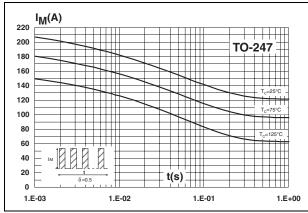
Figure 4. Normalized avalanche power derating versus junction temperature



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Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values, per diode)

Figure 6. Non repetitive surge peak forward current versus overload duration (maximum values, per diode)



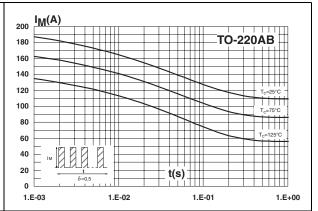
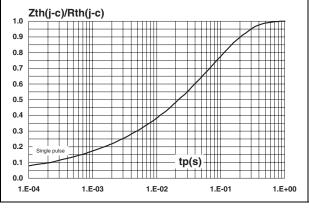


Figure 7. Relative variation of thermal impedance junction to case versus pulse duration

Figure 8. Reverse leakage current versus reverse voltage applied (typical values, per diode)



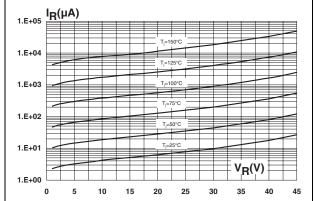
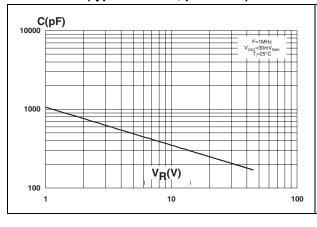
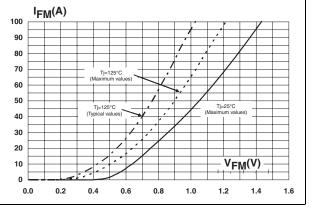


Figure 9. Junction capacitance versus reverse voltage applied (typical values, per diode)

Figure 10. Forward voltage drop versus forward current (per diode)





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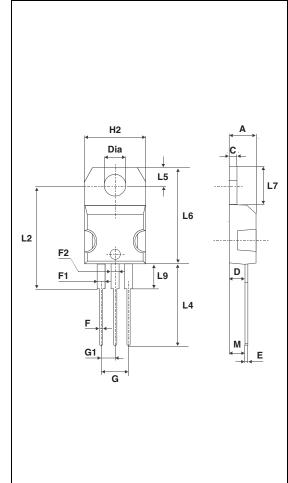
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2 Package information

- Epoxy meets UL94,V0
- Cooling method: by conduction (C)
- Recommended torque values: TO-220AB 0.4 to 0.6 N⋅m, TO-247 0.55 N⋅m
- Maximum torque value: TO-247 1.0 N⋅m

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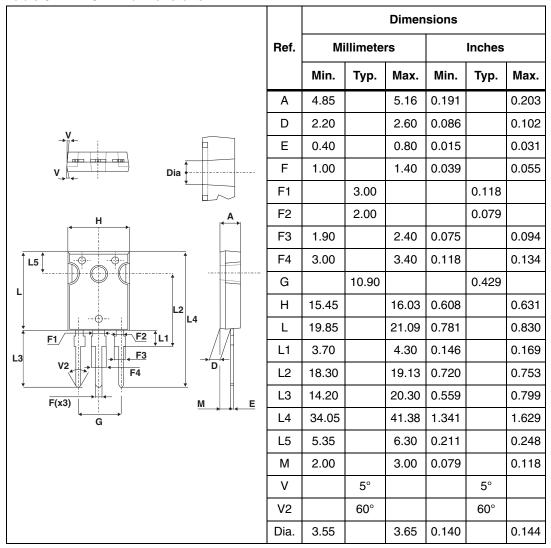
Table 5. TO-220AB dimensions



	Dimensions				
Ref.	Millimeters		Inc	hes	
	Min.	Max.	Min.	Max.	
Α	4.40	4.60	0.173	0.181	
С	1.23	1.32	0.048	0.051	
D	2.40	2.72	0.094	0.107	
Е	0.49	0.70	0.019	0.027	
F	0.61	0.88	0.024	0.034	
F1	1.14	1.70	0.044	0.066	
F2	1.14	1.70	0.044	0.066	
G	4.95	5.15	0.194	0.202	
G1	2.40	2.70	0.094	0.106	
H2	10	10.40	0.393	0.409	
L2	16.4	typ.	0.645 typ.		
L4	13	14	0.511	0.551	
L5	2.65	2.95	0.104	0.116	
L6	15.25	15.75	0.600	0.620	
L7	6.20	6.60	0.244	0.259	
L9	3.50	3.93	0.137	0.154	
М	2.6 typ.		0.102	2 typ.	
Diam.	3.75	3.85	0.147	0.151	

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Table 6. TO-247 dimensions



3 Ordering information

Table 7. Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS4045CW	STPS4045CW	TO-247	4.46 g	30	Tube
STPS4045CT	STPS4045CT	TO-220AB	1.9 g	50	Tube

4 Revision history

Table 8. Document revision history

Date	Revision	Changes
July-2003	4C	Previous issue.
09-Nov-2009	5	Added TO-220AB package. Removed SOT-93 package.

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